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NAVAL SEA SYSTEMS COMMAND

PM4

NAVSEA
DAHLGREN

ICM CARGO OVERVIEW

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Outline

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- System Requirements
- Baseline Test Results
- Extended Range Phase
- SuW Quicklook Test Results
- Program Status

5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition

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Mission

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Meet the USMC's requirement for "inexpensive, volume fire munitions" during the "critical early stages of ship-to-objective maneuvers when organic artillery is afloat"

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System Requirements

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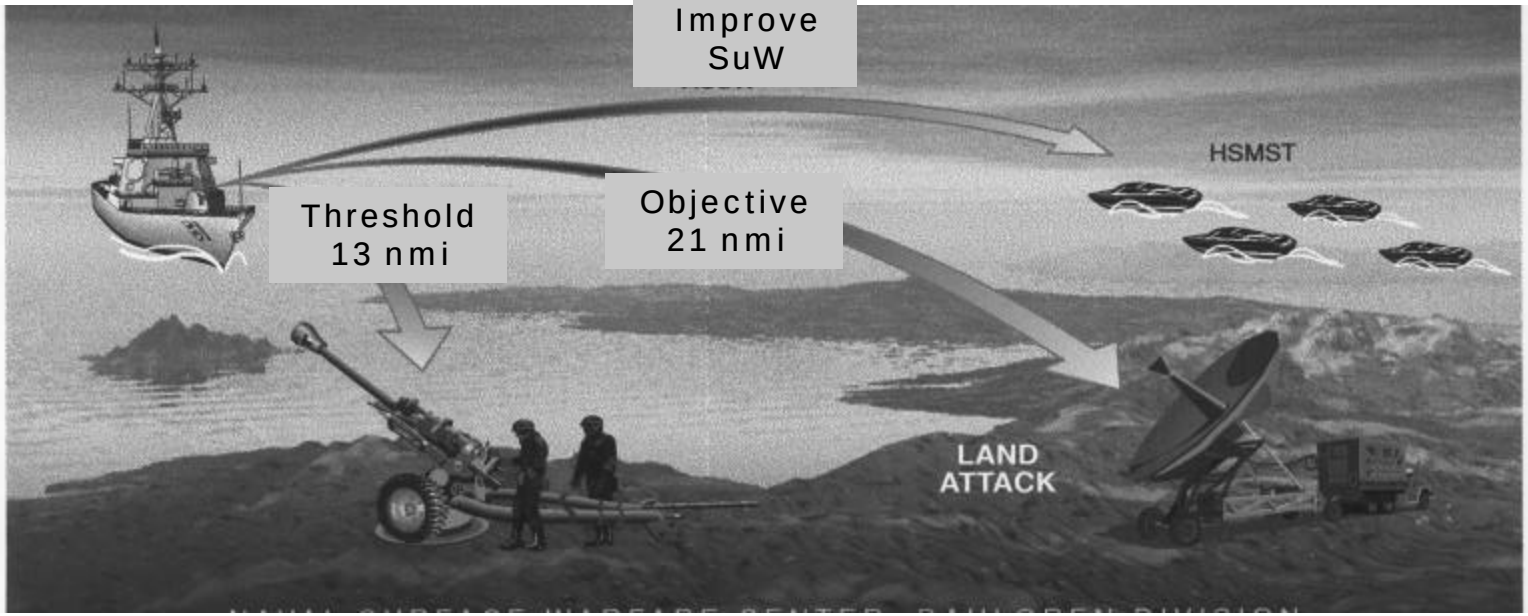
Multi-Mission Capability



5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition

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N764 Requirements Letter

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- **14 June 2000**
- **Requested COMOPTEVFOR to provide an operational assessment for 13 nmi (threshold) and 21 nmi (objective)**
- **Demonstration of SuW capability**
- **Planned for 2nd Qtr FY02 on DDG-82**

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5-Inch Cargo Projectile
MK 172, HE - ICM

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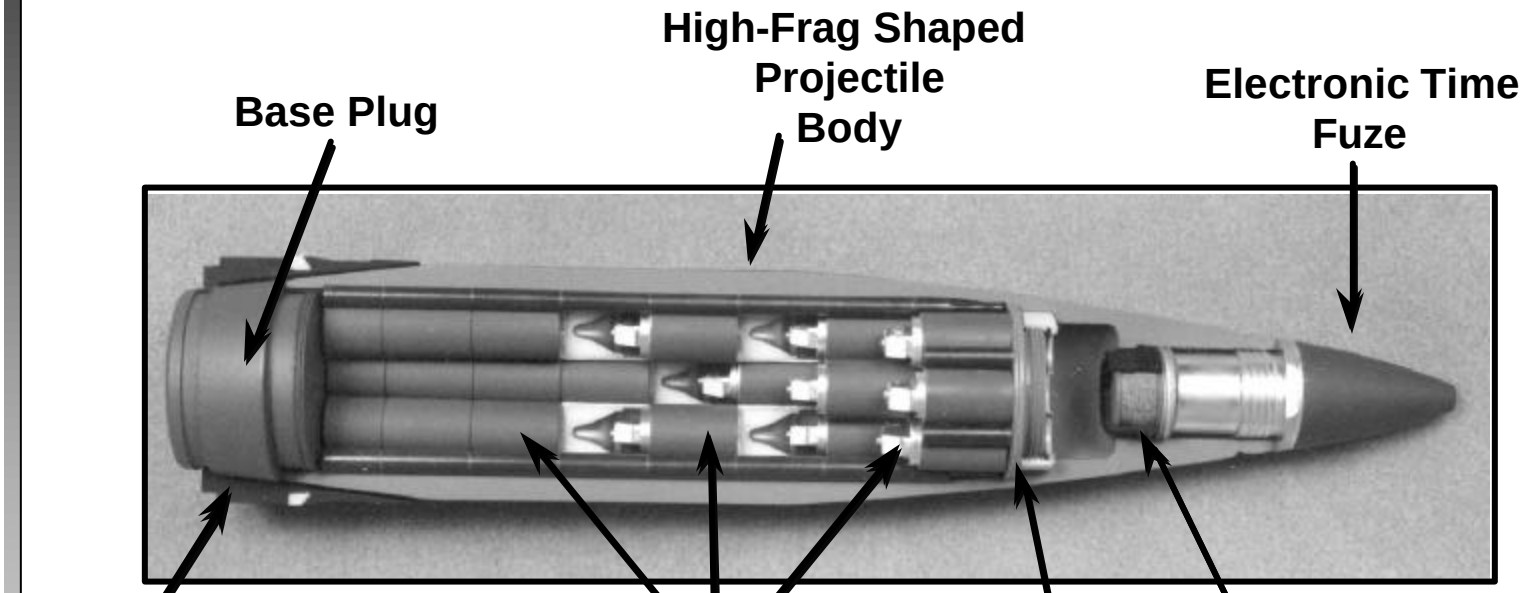

5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition 5-inch conventional ammunition

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Baseline Test Results

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- **Baseline Phase is complete**
- **Gunfired over 210 projectiles**
  - **Expulsion rate for M762 fuzed projectiles - 97.3%**
  - **Submunition dud rate - 1.8%**

Numbers include before/after environmental testing and 5"/54 service proof pressures.

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Extended Range Phase

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- **Qualify Low Cost Fuze – Navalized M762**
  - **Utilize Navy fuze setter**
  - **Better time accuracy**
- **Qualify Other Loads**
  - **Illum/Cargo Trainer**

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Extended Range Phase

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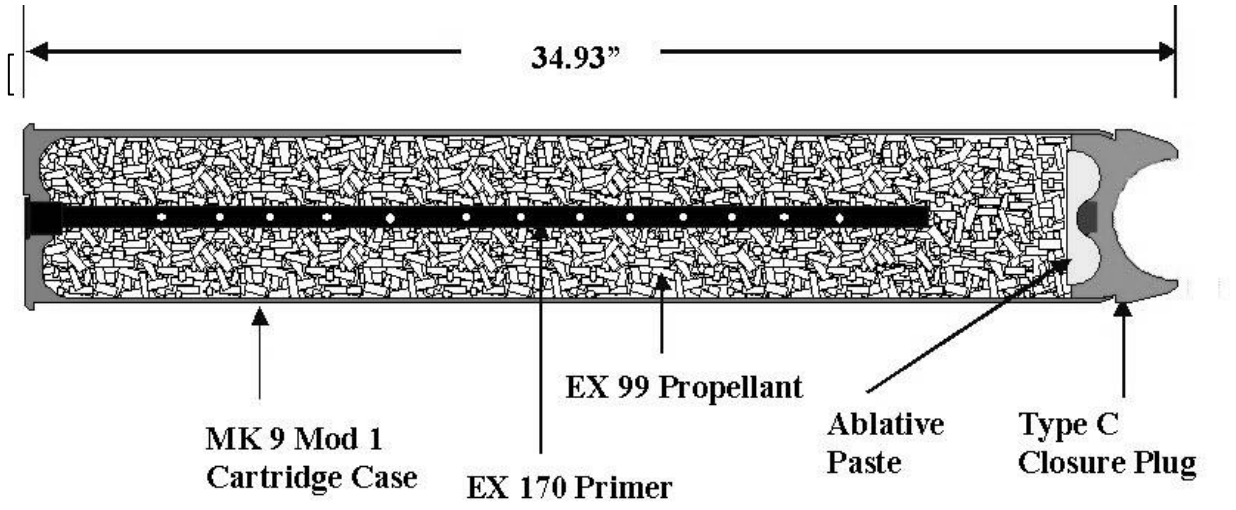
- **Qualify Extended Range Propelling Charge (EX 175)**
  - **Take advantage of upgraded 5”/62 MOD 4 gun to increase range from 13 nmi to 21 nmi**



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HI-FRAG with Extended Range Propelling Charge (EX 175)

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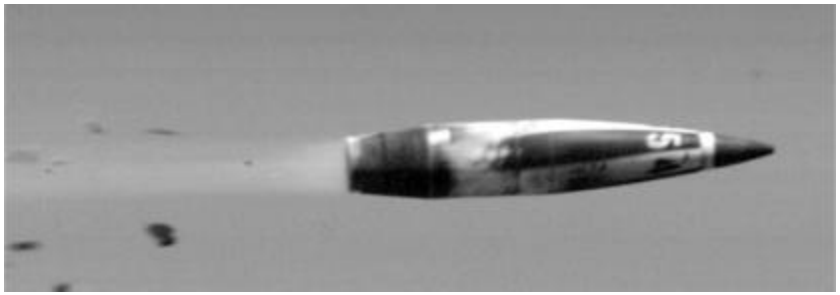
- **Recently conducted EX 175 ER Propelling Charge ranging tests with HI-FRAG and EX 172 Cargo Projectiles**
- **Results**
  - **HI-FRAG – 35,272 yds (17.4 nmi)**
  - **Cargo – 30,585 yds (15.1 nmi)**
- **At max elevation, can achieve these ranges**
  - **HI-FRAG – 41,260 yds (20.4 nmi)**
  - **Cargo – 41,030 yds (20.3 nmi)**



SuW Scenario
Range 2,000 yards (1.8 Km)

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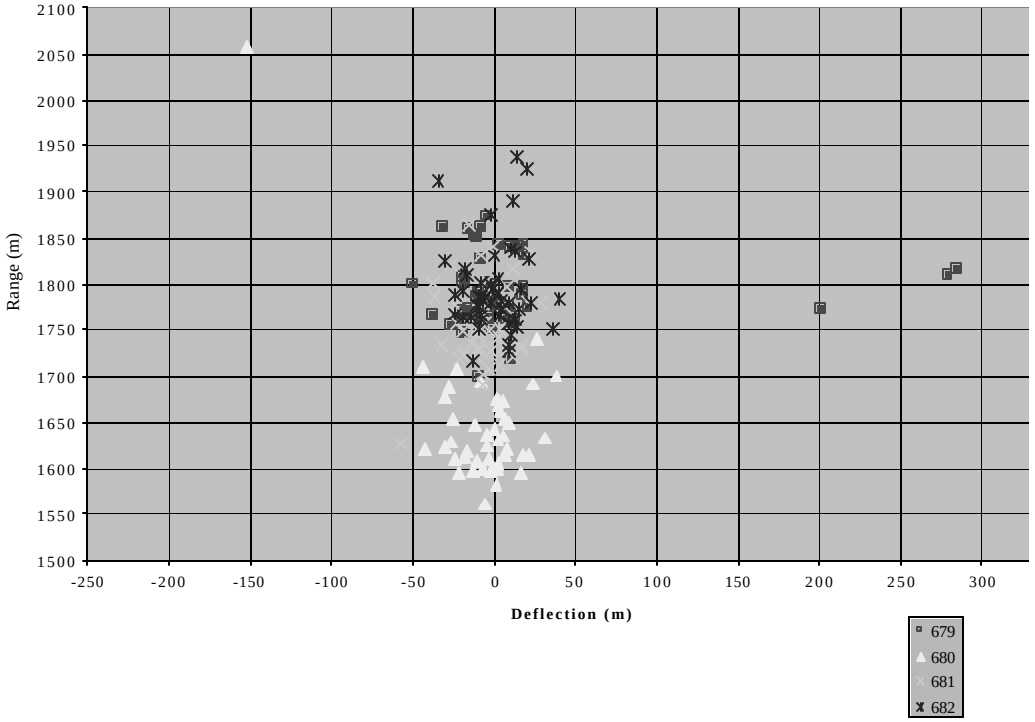
- **Impact Pattern 100 x 300 meters**
- **Detonation Rate only degraded by 15% at 2,000 yards**

Submunition Impact Locations



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YPG SuW Test

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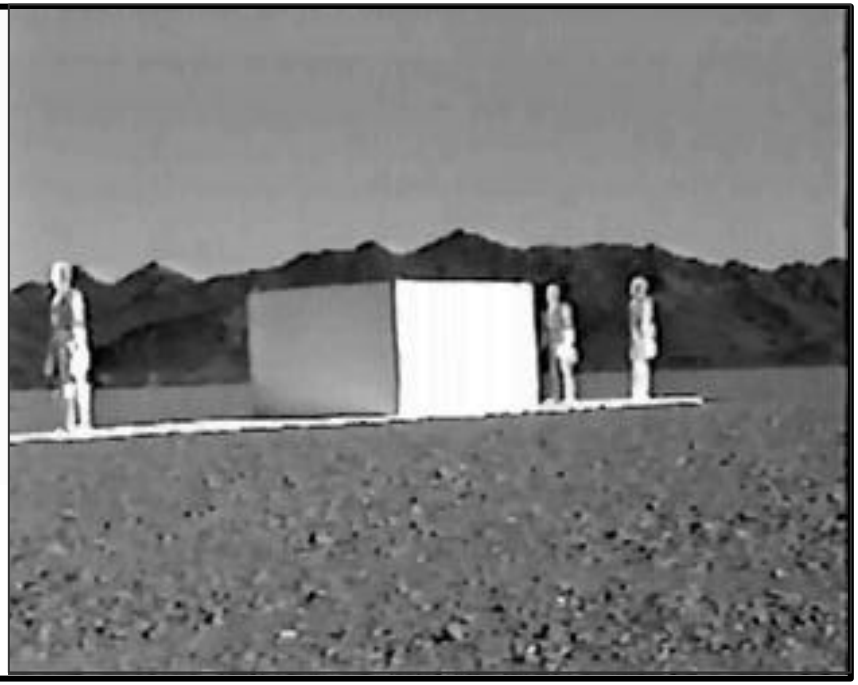
Click inside video window to start video clip

Click to stop



- **16 December 2000**
- **Range »2000 yds against simulated HSMSTs**
- **MK 2 HE Submunitions**
- **The same round is shown with 3 different camera angles**

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ICM Cargo SuW

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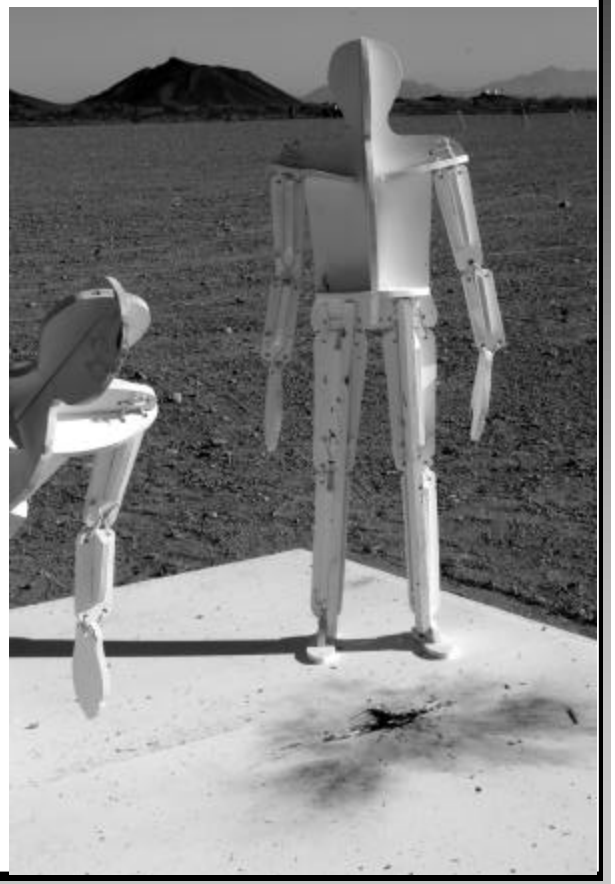
- **MK 2 Submunition Fragment and Shaped Charge Damage**



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Lethality Evaluation of SuW Test Results

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- **Location, length, width, and depth of fragment impacts physically recovered from plywood mannequins**
- **Estimate mass and velocity of each impact**
- **Compute level of incapacitation of each impact**
  - **Sperrazza-Kokinakis algorithm**
    - **Soldier with helmet and winter clothing**

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Lethality Evaluation of SuW Test Results

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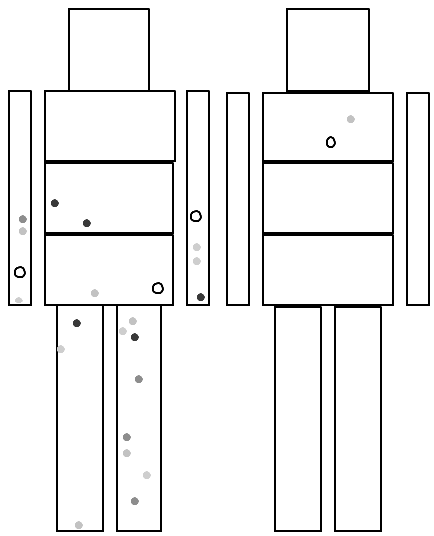
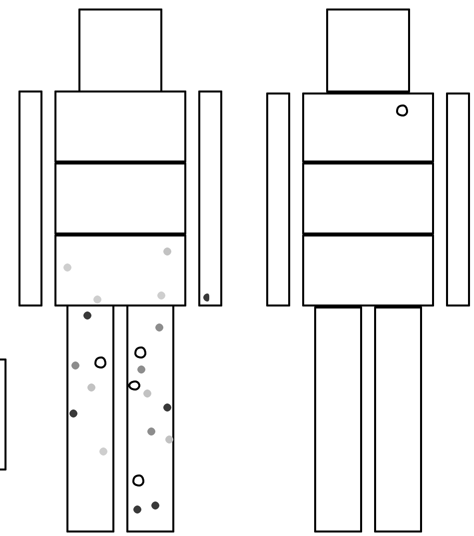
Mannequin #1

Front Back



Mannequin #2

Front Back



Gray - ≤ 2 grains
White - not evaluated

Level of Incapacitation (Mannequin #1)	Exclude fragments	Level of Incapacitation (Mannequin #2)
1.000	NONE	0.999
0.991	> 10 grains	0.959
0.934	> 5 grains	0.681
0.657	> 2 grains	0.257

Cargo Improvement Program Master Schedule

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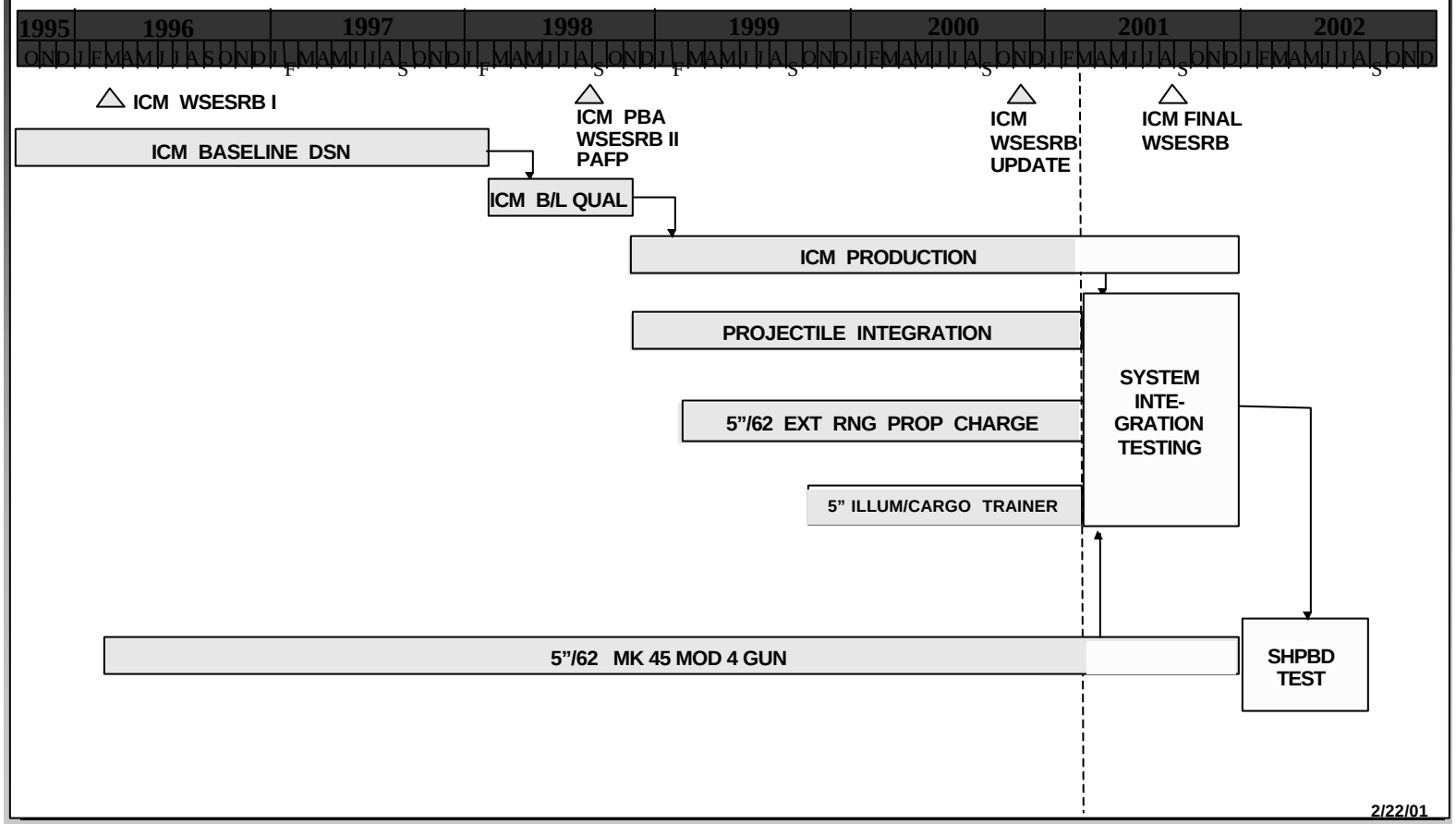

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Cargo Production Status

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- **Weapon System Explosives Safety Review Board (WSESRB) recommended Provisional Approval for Production (PAFP) on 3/25/98**
- **Limited production of 14,300 projectile body assemblies initiated (w/minimum of 100% option)**
- **Joint Army/Navy buy of submunitions saved the Army over $2.5M and the Navy over $2M**
- **First deliveries are anticipated in FY01**
- **Received numerous FMS inquiries**

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Costs

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➲ **Extended Range Propelling Charge (EX 175) Unit Cost**	**$1200-1600/unit if procured without ERGM EX 167**
	$600/unit if procured with ERGM EX 167
➲ **MK 172 HE-ICM Projectile Total**	**$1621/unit**
• **Projectile Body Assy**	**$1448**
• **ET Fuze**	**$137**